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COMMITTEE OF EXPERTS ON THE
TRANSPORT OF DANGEROUS GOODS

Sub-Committee of Experts on the
Transport of Dangerous Goods
(Fourteenth session,
Geneva, 8-18 December 1997,
agenda item 2 (c))

DRAFT AMENDMENTS TO THE MODEL REGULATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Other packaging and IBC matters

Inclusion of Test Temperature in the Packaging Designation Code

Transmitted by the Observer from New Zealand

Introduction

Plastic drums, jerricans, plastic boxes, other than polystyrene boxes, and plastic, composite packagings (plastic material), combination packages with plastic inner packaging, other than plastic bag intended to contain solids or articles, (6.1.5.3.2 10th ed) and rigid plastics and composite IBC's (6.5.4.9.2) are required to be cooled to at least minus 18 degrees Celsius before undergoing the Drop Test.

At the thirteenth session, Experts from Finland, Canada and Norway indicated that winter temperatures in their countries were often colder than this reference temperature (-18 °C). In many other countries temperatures never fall this low.

The UN packaging standards were developed to assist with international trade and it was therefor reasonable to adopt reference temperatures which were relatively representative of the temperature ranges likely to be encountered in international transport. i.e. 55 °C and minus 18 °C.

A growing number of Countries are now basing their internal land transport legislation on the UN Recommendations. This trend will increase with the Recommendations now becoming Model Regulations. In the majority of instances packaging used in land transport remains with that country. Under these circumstances the packaging should be tested to comply with the temperature ranges likely to be encountered.

It is unreasonable and imposes significant additional cost to require packaging used solely in a tropical country to be drop tested at minus 18 degrees when the ambient temperature never falls below 20 °C. For countries near the Arctic or Antarctic winter temperatures fall considerably below minus 18 °C.

Thus minus 18 °C is therfor not an addequate test temperature.

Proposal

It is proposed that the test temperature criteria in the Recommendations be amended to require testing over the temperature range likely to be encountered in transport. The default test temperature should remain at minus 18 degrees Celsius for the drop test for plastic drums, jerricans, plastic boxes, other than polystyrene boxes, and plastic, composite packagings (plastic material), combination packages with plastic inner packaging, other than plastic bag intended to contain solids or articles,(6.1.5.3.2 10th ed.) and rigid plastics and composite IBC's (6.5.4.9.2). If this test temperature is not appropriate, then testing at an alternative temperature approved by the Competent Authority should be permitted.

This can b e achieved by amending paragraphs:

6.1.5.3.2 to read "The temperature of the test sample and its contents shall be reduced to -18 °C. An alternative test temperature may be used with the permission of the Competent Authority. If an alternative test temperature is used this must be included in the UN Packaging Designatory Code as required by 6.1.3.1 (c)...."

and

6.5.4.9.2 (c) by modifying the current sentience re test temperature to. "...Testing of IBCs shall be carried out when the temperature of the test sample and its contents has been reduced to minus 18 °C. An alternative test temperature may be used with the permission of the Competent Authority. If an alternative test temperature is used this must be included in the UN Packaging Designatory Code as required by 6.5.2.1.1 (c)...."

Under these circumstances it is necessary to indicate in the plastic package the test temperature at which the drop test was carried out. This requires the addition of a test temperature identifier to be added to the UN Packaging Designatory Code.

This can be achieved by adding a new paragraph after 6.1.3.1 (c) to read;

"The test temperature for plastic packagings at which the drop test was conducted, in degrees Kelvin, expressed as xxxK. Where the drop test is conducted at the default test temperature of minus 18 degrees Celsius, this additional marking may be omitted.

A corresponding amendment should be made to 6.5.2.1.1

Justification

Test plastic packaging to the lowest temperature likely to be encountered in normal transport use will enhance safety and reduce the possibility of cold induced brittle failure. Allowing alternative test temperature will reduce the cost of testing and production for countries where -18 °C is not reached. This reduction in cost will not reduce safety. The test temperature designator in the Packaging Designator Code will clearly indicate the suitability of this packaging for its intended use.

The person filling the packaging is already responsible for ensuring that the package, is suitable for a particular use. Checking that the test temperature is appropriate for the intended journey would be another duty for the filler to perform. To check that the package is suitable the person filling the package must already check that the material the package is constructed from is compatible with the intended contents, that the package had been test to the correct standard i.e. check the packaging group of the substance to be filled with the Packaging Designating Code. Ensure that volatile liquids are suitable for filling into a package by checking the vapour pressure of the liquid and then checking the Packaging Designating Code.

Adoption of a Test Temperature Designation and inclusion of this in the Packaging Designator Code on packaging will enhance safety, and in many cases reduce the cost of packaging. Any factors which will promote wider use of UN specification packaging should be given serious consideration.

Recommendation

That the committee adopt the proposal for a Test Temperature Designator for Plastic Packaging and IBCs and alternative test temperatures.

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agenda item 2 (c))**

DRAFT AMENDMENTS TO THE MODEL REGULATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Other packaging and IBC matters

Leakproofness tests for aerosols and small receptacles for gas

Transmitted by the Expert from Germany

1. Introduction

The hot water bath has been part of the testing of pressure receptacles since the beginning of the industrial mass production about 50 years ago. This test method has been applied unchanged ever since then.

The testing of the leaktightness and integrity of filled pressure receptacles by this method has led to an accepted level of quality and safety during storage, transport and handling.

Any improvement in the performance of the hot water bath was fully under the responsibility of the filler. However, also this test method does include certain unsufficiencies related to safety, ecology and economy.

Insufficiencies with respect to safety may be seen in the missing detection time, which results in an unspecified sensitivity of the test method. The necessary detection time for leaking receptacles is in the range of several seconds in typical serial productions. As far as the detection of leaking receptacles is performed visiually, scientific investigations have shown a high degree of unreliability (rapid loss of attention).

Critical with respect to ecology are the considerable consumption of energy to heat the water bath and the expenses for the water volume, contaminated by leaking receptacles.

The application of complex quality management systems, which include overlapping quality controls of semiproducts and purchased articles, executed usually outside the filler companies makes the application of the hot water bath increasingly uneconomic, particularly where leak detection relies on employees.

Methods alternative to the hot water bath have been made available as part of modern quality management procedures. These procedures include quality controls of the manufacturing of the components of the receptacles on one hand those of its assembly by the filler.

Alternative leaktightness-test methods have been applied in Germany since serveral years with very large numbers of pressure receptacles, both, on one piece aluminium and on three pieces light gage metal receptacles. The alternative method applied is based on the sensitive measurement of the pressure differential in a test cap put on top of the filled receptable at room temperature.

The sensitivity of the pressure measurement is determined by a leakage rate, 5 times smaller then those of water bath test. This factor compensates the lower internal pressure due to the performance at room temperature (The sensitivity in terms of the leakage rate of the water bath test at the actual state of the art is considered to be 10^{-2} mbar l/s for this comparison, equivalent to two bubbles per second, with a diameter of 2 mm).

This alternative method of leaktesting is accompanied by a 100 % mass control of receptacles to account for the fact, that the main reason for the occasional failure of receptacles is mostly due to its overfill. The procedures are completed by quality controls of semiproducts and components, and, above all, by pressure tests of the receptacles bodies, performed at random according to statistical test plans.

All elements of this quality proof are part of quality management systems approved and audited by the competent authority.

The positive experiences with this alternative quality control procedures gained over years justify the adaption of the regulatory provisions to account for the process in science and technology.

2. Proposal

It's proposed to amend chapter 6.2 as follows:

"6.2.2.1 (a) Each receptacle shall be subjected to a test performed in a hot water bath, the temperature of the bath and the duration of the test shall be such that the internal pressure reaches that which would be reached at 55°C (50°C if the liquid phase does not exceed 95% of the capacity of the receptacle at 50°C). If the contents are sensitive to heat or if the receptacles are made of plastics material which softens at this test temperature, the temperature of the bath shall be set at between 20 °C and 30°C but, in addition, one receptacle in 2000 shall be tested at the higher temperature.

6.2.2.1 (b) No leakage or permanent deformation of a recaptacle may occur, except that a plastics recaptacle may be deformed through softening provided that it does not leak.

6.2.2.2 (a) Alternatively to 6.2.2.1, the leakproofness of the receptacles may be tested under a quality management system, approved by the competent authority, including a test method with a sensitivity of 2 10^{-2} mbar l/s for a reference temperature of the contents of 20° C, or of 1 10^{-2} mbar l/s for a reference temperature of 50° C, or an interpolated value for other temperatures.

As far as the test method works at temperatures of less than 50°C it shall be completed by a 100% mass control of the filled receptacles and an internal pressure test of the receptacles with a sampling rate of at least 1 per 2000 and with an internal pressure for a reference temperature of 50° C.

6.2.2.2 (b) No unacceptable leakages or deformations shall occur under these tests. Leakages are unacceptable, if the specified leakage rate is not complied with. Deformations are unacceptable, when they could adversaly affect transport safety and cause instability in stacks of receptacles."

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GLOBAL HARMONIZATION OF SYSTEMS OF CLASSIFICATION AND LABELLING OF CHEMICALS

Physical hazards

Classification of aerosol dispensers

Transmitted by the Expert from Norway

Introduction/Justification

In principle an aerosol dispenser is a receptacle containing substances, which may posses some hazardous characteristics. Accordingly, the presence of such characteristics should be communicated in the classification and labelling of the aerosol dispenser.

The flammability risk of an aerosol dispenser is not recognised by the present special provision 63, which states that there must be more than 45 % by mass or more than 250 g flammable components for assignment to Division 2.1. (This criteria originally comes from an EC directive, from which it was excluded by a revision in 1994). Performance tests for detection of the flammability risk of aerosol dispensers, e.g. as in the ICAO Technical Instructions, does not recognise a flammable propellant gas.

Classification of aerosol dispensers with a flammable propellant gas as flammable, is in our opinion very important and has been required in Norway for consumer protection since 1982. Proper transport classification according to the contents of the aerosol dispenser, is also important for the safe storage and handling.

Proposal

It is proposed to amend the existing special provision 63 as follows:

The division of Class 2 and the subsidiary risks depend on the nature of the contents of the aerosol or small receptacle. The Division 2.1 applies if:

- the propellant gas is a flammable gas or gas mixture, or
- the liquid phase is a substance or mixture with a flash point of 60 °C or less, or
- the discharged contents are defined as flammable in the performance test described in ICAO Technical Instructions.

When assigning primary and subsidiary risks, Division 2.3 takes precedence over Division 2.1, and Division 2.1 takes precedence over Division 2.2. Other dangerous properties are assigned as subsidiary risks according to the Class or Division of the liquid or solid phase.